

Claims

What is claimed is:

- [c1] A directory server comprising:
a supplier server;
a consumer server in communication with the supplier server;
a plurality of pluggable services that manage replication of data contained within
the directory server from the supplier server to the consumer server; and
a change sequence number used to determine ordering of operations performed on
the consumer server;
wherein replication of data is managed using the change sequence number.
- [c2] The directory server of claim 1 wherein the change sequence number is a tuple
comprising a time stamp portion, a sequence number portion, a replica identifier
portion, and a sub-sequence number portion.
- [c3] The directory server of claim 1, wherein a highest value of the change sequence
number is maintained in stable storage.
- [c4] The directory server of claim 2, wherein the timestamp portion is represented by
logical time and is thirty-two bits in length.
- [c5] The directory server of claim 2, wherein the timestamp portion comprises a
network offset component.
- [c6] The directory server of claim 2, wherein the sequence number portion is generated
by an incremental counter and is sixteen bits in length.

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- [c7] The directory server of claim 2, wherein the replica identifier portion denotes an identifier of the consumer server that generated the change sequence number and is sixteen bits in length.
- [c8] The directory server of claim 2, wherein the sub-sequence number portion is used to order operations within a single operation and is sixteen bits in length.
- [c9] The directory server of claim 2, wherein the change sequence number is assigned when an entry is modified by a client.
- [c10] A method of generating a change sequence number, comprising:
initializing the change sequence number;
retrieving a timestamp portion;
retrieving a sequence number portion;
retrieving a replica identifier portion; and
retrieving a sub-sequence number portion;
wherein the timestamp portion, the sequence portion, the replica identifier portion,
and the sub-sequence portion are joined into a tuple that forms the change
sequence number.
- [c11] The method of claim 10, further comprising:
maintaining a highest value of the change sequence number in stable storage.
- [c12] The method of claim 10, wherein the timestamp portion is represented by logical time and is thirty-two bits in length.
- [c13] The method of claim 10, wherein the timestamp portion comprises a network offset component.
- [c14] The method of claim 10, wherein the sequence number portion is generated by an incremental counter and is sixteen bits in length.

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- [c15] The method of claim 10, wherein the replica identifier portion denotes an identifier of a server that generated the change sequence number and is sixteen bits in length.
- [c16] The method of claim 10, wherein the sub-sequence number portion is used to order operations within a single operation and is sixteen bits in length.
- [c17] The method of claim 10, wherein the change sequence number is assigned when an entry is modified by a client.
- [c18] An apparatus for generating a change sequence number, comprising:
means for initializing the change sequence number;
means for retrieving a timestamp portion;
means for retrieving a sequence number portion;
means for retrieving a replica identifier portion;
means for retrieving a sub-sequence number portion; and
means for joining the timestamp portion, the sequence portion, the replica identifier portion, and the sub-sequence portion into a tuple that forms the change sequence number.

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